

Accelerator Systems Division Highlights Ending July 22, 2005

Installation

Craft Snapshot 7/1205

ASD productive craft workers	60.0
Foremen (Pd by 15% OH)	7.0
AMSI management (Pd directly)	3.0
TOTAL AMSI WORKERS	70.0
Less WBS 1.9, 1.2 etc	13.0
Less absent	3.0
TOTAL PD BY ASD/ORNL DB WPs	56.0

Accelerator Physics

Operations

- Worked with technical, safety and administrative groups on clearing the Pre Start Action Items from the CCL4-SCL Linac Accelerator Readiness Review
- Continued to operate the beam in the Front End for Pre-Start testing
- Continued with RF Processing of the DTL, CCL and SCL

Ion Source

- Survey and Alignment laser-tracked the 4 new fiducials on the ion source receptor flange while the ion source was tilted to 6 different angles and the LEBT was moved to 11 different positions. The data suggest that the ion source tilt indicator has an accuracy of $\sim 0.01^\circ$. The accuracy of the LEBT position indicators is $\sim 0.1\text{mm}$.
- The ion source and LEBT were aligned based on 20 beam measurements averaged over ~ 1 minute. The best RFQ transmission was found in the same position as last January.

Survey and Alignment

Mechanical

Magnets

- We have sent two more 21Q40 assemblies to the RTBT. Another assembly is in progress.
- The first 30Q58 is in the measurement stand.

Water Systems Installation

- Electrical power and control connections to the HEBT collimator cooling systems were completed.
- Repair of an interconnecting buss on one of the Ring injection kicker magnets was completed.
- Installation and leak testing was completed for the all main Ring magnets.
- The Ring Service Building Power Supply cooling skid was successfully leak tested and placed into operation.
- One of the pumps on the Ring Service Building Magnet cooling skid was removed and sent out for repair.
- A leak inside one of the RF Power Supply units was repaired.
- Preventative Maintenance on the Linac water systems continued.

Ring Systems Installation

- The filling of the HEBT Collimators' cooling system was started.
- The HEBT beamline scraper operational testing was started.
- The HEBT chicane shield wall construction was completed and the wall painted.
- The HEBT chicane shield wall fire proofing was started.
- The Ring collimator SS QMM diagnostic was assembled.
- The RTBT 21Q40 magnets QV17 and QH16 were installed.

Electrical

HPRF

Ring RF

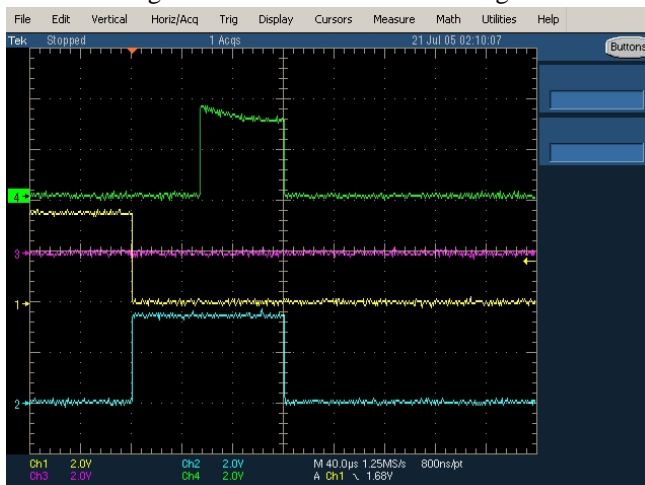
- Tunnel Grounding is complete.
- Signal cables are terminated for first station.
- Installation of signal jumper cables into the Ring Control Room is under way, 20% complete. (Not needed to run RF to 1st cavity).

LLRF

Cryo Systems

Controls

- The Controls Group is in a world of hurt having lost Sheng Peng to LCLS this week. Sheng developed the software for all SNS DC power supplies, as well as for the Ring Injection Kickers, the Extraction Kickers and the Ring Low-Level RF Systems. Testing of these systems begins next week.
- The Controls Group welcomed Larry Hoff from BNL this week. Larry worked on the handoff of a number of Ring systems (progress reported below) and we look forward to his return in one week's time.
- The PPS team met with Marc Ross of SLAC this week to develop a strategy was for the use of a Long Ion Chamber in the Linac Tunnel, along with other possible means of mitigating potential radiation hazards from beam loss scenarios.
- In preparation for inject bump PS testing, all necessary PSC modules and EPICS S/W were loaded into the injection IOC in the Ring Service Bldg. EPICS screens were exercised in the control room.
- The "VxStats" program was enhanced to alarm when VxWorks tasks become suspended. To demonstrate that no change comes without peril, this enhancement made prominent curious behavior of the "soft motor" software, used in the SCL HP IOCs. Suggestions for addressing this issue are under discussion.
- Tested SCL Vacuum signals to the MPS were tested. Only 1 zone is left untested due to unconnected valves. Work also continued on the LEBT Steerer power supplies. The LEBT chopper system is ready to install when the rack arrives and new control boxes are assembled. The CCL and DTL Vacuum IOCs have at last been converted to EPICS v3.14.7, bringing these to the standard of the rest of the IOC.
- The option of using a network data server so the archiver can be run stand-alone (rather than as a web-server plug-in) was implemented. This will allow users to run a temporary network data server for reading a CD ROM, for example.
- The Warm Linac LLRF systems were upgraded to the same version as the SCL LLRF systems. An interlock has been provided to drop beam permit when in open loop or out of regulation. Indicators for "RF permit" and "Beam permit" were also implemented.
- Work continued on the Target control systems. Valve positioners for the 28 valves used to control water cooling loops for the target were calibrated. Both EPICS and PLC software for cooling water loops 1 and 2 has been further upgraded by SvT. Acceptance testing must still be done. The Controls Engineer from ACE Controls visited to install more file servers for the moderator/cold box.
- A test was run on the proposed system to limit the beam pulse length to under 50usecs using the trigger control chassis with a pulse generator supplying a 1 Hz enable with a 50 usec pulse width. In the top picture below, the top trace (#4) is the 10 Hz pulse going to the source. The source is running at 10 Hz. Beam is running at 1 Hz. The second trace (#3) is the repetition-rate enable from the pulse generator. It can be seen to be at 1 Hz. The bottom trace is the pulse width enable from the pulse generator. It appears that the source is missing a pulse; however in reality the source is running a 1 msec pulse at 10 Hz. The source pulse for beam is being shortened to 50 usec so it appears not to be there, but it can be seen in the expanded view of beam time shown in the second picture.
- HEBT motion handoff went very well. The 8 axes of HEBT halo scraping were all successfully exercised. Two axes indicate apparent wiring issues which are being investigated. The S/W which configures the motor driver hardware was installed on a couple laptop computers, and used in the field to verify motor driver operation. The two momentum scraper motors will be tested shortly (they use a different connector than the HEBT halo scrapers).
- Initial testing of the HEBT collimator cooling water controls is proceeding. Most signals have been verified from the



field sensor to the EPICS screens. Calibration and adjustment of the sensors will begin next week. A HEBT vacuum test plan is under development and should be completed next week.

Beam Diagnostics

- Supported beam studies in the front end
- Investigated phase measurements made by the MEBT BPMs. Analysis software was rolled back to a previous version and the phase signatures are as expected. Results are still OK when the new timing card is used. The signal levels from the electrodes are still lower than expected, so the investigation continues.
- Significant progress was made on the SCL laser system. We still expect that this system will be ready for use in about one week.
- Had discussion with BNL regarding participation of BNL staff in the ring diagnostics deployment.